Livingston
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PortMaster
User's Manual

PM-11
Communications Expander
& Terminal Server

User's Manu

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PM-11
Communications Expander
& Terminal Server

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Introduction CHAPTER 1

The PortMaster PM-11 is a high performance serial and parallel communications expander. The PortMaster is specifically designed for the Sun Workstation computing environment. PortMaster allows asynchronous communications devices such as terminals, Personal Computers, printers, modems, host computers, and other RS-232-C or parallel devices to be easily attached to a Sun Workstation.

PortMaster provides the following features and capabilities:

- Ten RS-232-C serial ports
- One Centronics-compatible parallel printer port
- All communications parameters configurable on-line
- Remote control from your Sun Workstation
- Connect to your existing Ethernet hardware
- Monitoring of performance and PortMaster configuration through a standard ASCII terminal.

PortMaster operates as a smart communications device attached to your Ethernet network. It utilizes TCP/IP networking protocol to communicate and establish virtual login and device services on host Sun Workstations. Each of the ten PortMaster serial ports is independently configurable to support all types of RS-232-C communications devices. The parallel port provides standard Centronics parallel communications for many printers.

Operating Modes

Each serial port can be configured to operate in one of three modes:

User Login Mode - Displays a user login prompt to establish a session on the Sun host. In this mode, PortMaster provides

speed matching of one of three speeds from 300 through 19,200 baud.

Host Device Mode – Serial port functions as a UNIX tty device. The Sun host accesses the port through a standard pseudo tty driver as if the port were physically connected as a hardware device.

Bidirectional Mode – In this mode, both User Login and Host Device Mode are supported. When a session has been established in user login mode, host device mode is suspended. When the host device is being directly accessed, user login mode is suspended. The allows for applications such as UUCP to utilize one modem in both directions.

The parallel port, P0, functions in only the Host Device Mode.

Smart Features

The intelligence of the PortMaster allow it to be remotely configured and monitored from a Sun Workstation. By utilizing Sun's graphical user interface (Sunview) all functions of PortMaster can be accessed with the click of a mouse. This includes installation, network setup, port configurations, and I/O monitoring.

About This Manual

This manual is intended for use by those who are familiar with Sun Workstations, Ethernet, TCP/IP and networking. Where needed, refer to your Sun documentation for complete information on that product.The manual is organized into three chapters:

Chapter 1: *Introduction* – describes the PortMaster hardware and software.

Chapter 2: *Installation* – describes the steps to follow to complete the installation of the PortMaster hardware and software.

Chapter 3: *Administration* – describes the process used for configuring the serial and parallel ports and the monitoring of PortMaster operations. This includes the Sunview based PortMaster Console program and the ASCII terminal based command program.

Appendix:
Using /dev entries – Creating entries in the /dev directory.
Specifications – lists the PortMaster specifications.
Glossary – Definitions of terms used in the manual.

Requesting Assistance

If you have any questions about PortMaster, please use the following, toll-free number:

1-800-458-9966

Installation CHAPTER 2

This chapter describes installing the PortMaster hardware, the Workstation software, host installation and initializing the PortMaster. The following chapter describes how to use and administer the PortMaster.

Hardware Installation

The PortMaster can be situated sitting either right-side up or on the right-hand side of the unit, as viewed from the front. No other positions are allowed. There are no internal adjustments or modifications for the user. You should locate the unit in a clean, cool environment, such as the normal office environment.

Rear Panel Layout

Figure 2-1 shows the locations of the major features of the PortMaster rear panel:

Power - Voltage selection, power switch and power connector

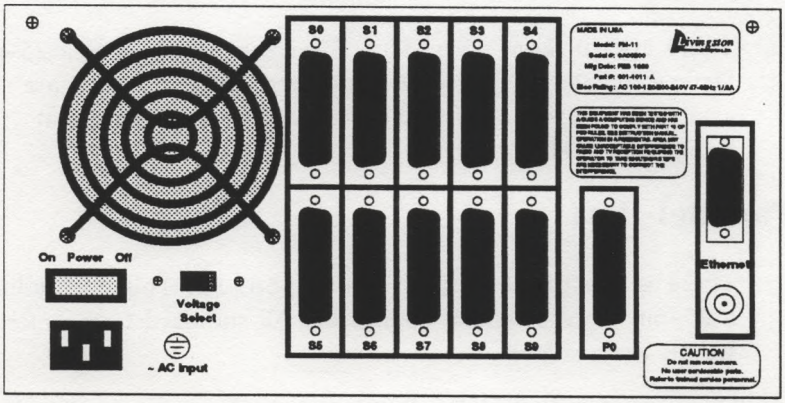

Figure 2-1. Rear Panel Layout

Serial Ports – Ten fully programmable RS–232–C ports (S0 through S9)

Parallel Port – A single Centronics–compatible connector (P0)

Ethernet – Two connectors, one is a 15 pin D–type connector (for Thick Ethernet or a compatible transceiver) and the other is a BNC connector (for Thin Ethernet). The selection of either is installed at the factory and is not user–changeable.

Power Selection and Connection

AC power to the PortMaster is connected using a standard power cable. The choice of 110 VAC or 220 VAC power can be selected by a rear panel switch.

CAUTION

Check that the selection, showing in the cutout for the voltage selection switch, is the same as your local supply. A mismatch can have disastrous effects on your PortMaster.

Serial Ports

There are 10 serial ports, S0 – S9. Each port utilizes a 25–pin D–type female connector. All standard RS–232 signals are available. The connection is configured as Data Terminal Equipment (DTE).

Parallel Port

There is one parallel printer output port, P0. This port utilizes a 25–pin D–type female connector. All standard Centronics signals are available.

Ethernet Connection

There are two types of Ethernet connection for the PortMaster:

Thin Ethernet – a BNC connector for direct connection to the Workstation Thin Ethernet connector.

Thick Ethernet – the standard Ethernet D-type connector for connection to a transceiver on the Ethernet.

Which of the two is in effect for your PortMaster is indicated as an option on the carton in which the PortMaster was shipped and on the packing list which came with the product. This is set at the factory and is not user-changeable.

Connecting Power

To connect power to the PortMaster, connect the 3-conductor female plug to the rear panel of the PortMaster. Connect the 3-pin male plug to the appropriate source of AC power.

Connecting Serial Devices

To connect serial devices to the PortMaster, simply connect a male RS-232 connector to the appropriate rear panel connector: S0 through S9. Each of the serial ports is wired as Data Terminal Equipment (DTE). When connecting serial cables to these ports, secure the connectors together using either a screwdriver or the finger-screws mounted to the cable connector. Pin 1 is located in the upper-left corner of the rear panel connector (the row with the most pins).

The following table lists the PortMaster DTE serial port connections. The directions, input/output, are with respect to the PortMaster. All pins which are not listed have no connection.

Connections for Serial Ports S0 – S9

Pin	Name	Description	
2	TXD	Transmit Data	(output)
3	RXD	Receive Data	(input)
4	RTS	Request to Send	(output)
5	CTS	Clear to Send	(input)
6	DSR	Data Set Ready	(input)
7	SGND	Signal Ground	
8	DCD	Data Carrier Detect	(input)
20	DTR	Data Terminal Ready	(output)

Connecting Parallel Devices

To connect a Centronics–compatible parallel device, use a cable that has a 25–pin male DB–25 connector at one end and a 36–pin Centronics connector at the opposite end. The P0 pinout is compatible with the parallel ports of Personal Computers. When connecting the parallel cable to this port, secure the connectors together using either a screwdriver or the finger–screws mounted to the cable connector. Pin 1 is located in the upper–left corner of the rear panel connector (the row with the most pins). The following table lists the pinout of P0.

Connections for Parallel Port – P0

Pin	Name	Description	
1	Strobe	Strobe	(output)
2	D0	Data Bit 0	
3	D1	Data Bit 1	
4	D2	Data Bit 2	
5	D3	Data Bit 3	
6	D4	Data Bit 4	
7	D5	Data Bit 5	
8	D6	Data Bit 6	
9	D7	Data Bit 7	
10	ACK	Acknowledge	(input)
11	BUSY	Printer Busy	(input)
12	PE	Paper Empty	(input)
13	Sel.	Device Select	(output)
14	AF	Auto Feed	(output)
15	Err.	Error	(output)
16	Init.	Initialize Printer	(output)
17	Sel. In.	Select Input	(output)
18–25	GND	Ground Connections	

Connecting the Ethernet

To connect the Ethernet, either Thin or Thick Ethernet, use the appropriate PortMaster rear panel connector.

Thin Ethernet

The Thin Ethernet BNC connector is the one below the Thick Ethernet connector D-type connector. Connect a coaxial cable between the PortMaster Thin Ethernet connector and the Sun Workstation. Termination is required at each end of the Thin Ethernet coaxial cable. Use the BNC T-adapter and terminations, included with the PortMaster. Figure 2–2 illustrates a Thin Ethernet connection between the PortMaster

and a Sun 3/60 Workstation and between the PortMaster and a Sun 4/60 Workstation.

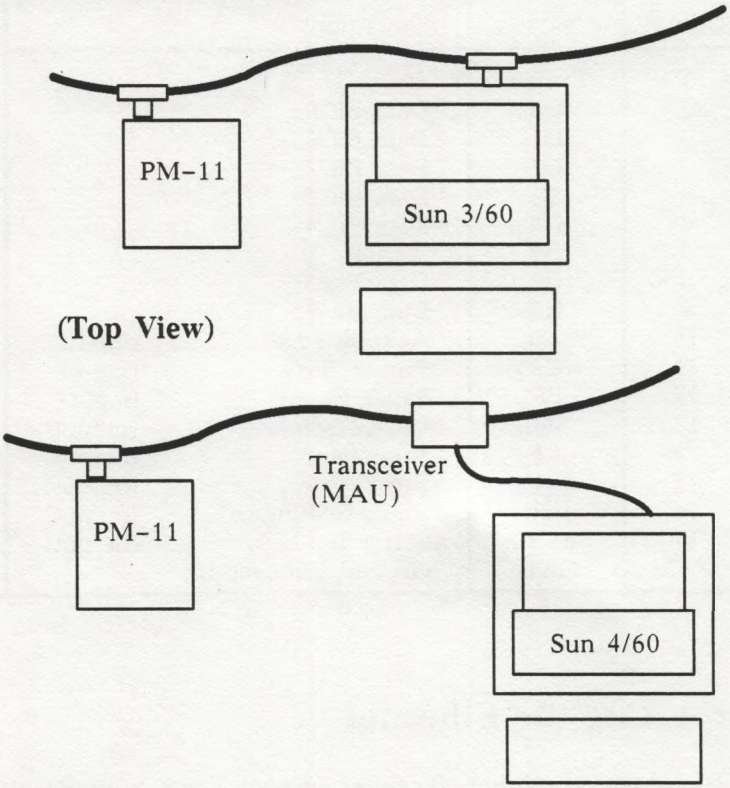

Figure 2-2. Thin Ethernet Connections

Thick Ethernet

A 15 Pin D-type connector is located on the rear panel of the Port/Master above the Thin Ethernet BNC connector. Connect the Ethernet transceiver cable to the PortMaster rear panel

connector. Slide the locking ring until the connection is secure. Figure 2–3 illustrates a Thick Ethernet connection.

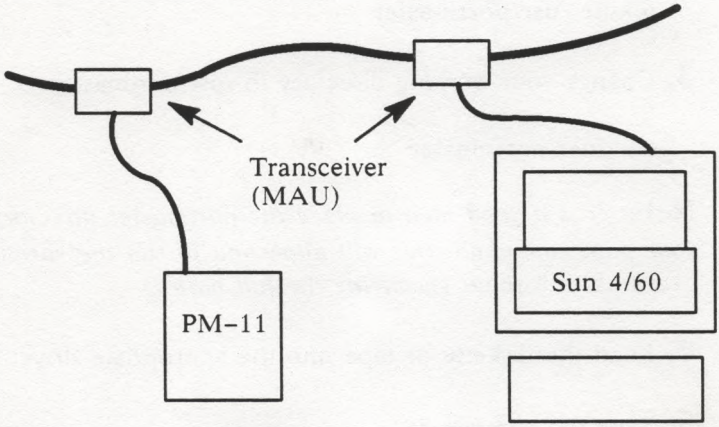

Figure 2–3. Thick Ethernet Connection

Workstation Software Installation

Included with your PortMaster is software in one of three forms: 3.5" floppy diskette, 1/4–inch tape cartridge or a reel of 1/2–inch tape. To install the software you will need to have a minimum of 2 MB of disk space.

Loading from Tape or Floppy Diskette

Use the following procedure to load the PortMaster software onto your Sun computer:

1. Log on as root or super–user.

2. Using mkdir, create a directory called /usr/portmaster. This is the recommended directory location and name. If you wish

to use a different name directory, substitute that name in the following command:

mkdir /usr/portmaster

3. Change your working directory to /usr/portmaster.

cd /usr/portmaster

Note: *It is a good idea to place the portmaster directory in your path command, this will allow you to run the various executables without specifying the full path.*

4. Load the diskette or tape into the appropriate drive.

5. Type the command:

tar xvf /dev/<device>

where <device> is the raw device of your tape or diskette drive. The following table lists the devices for the Sun Workstation.

Tape and Diskette Device Types

<device>	Description
rar0	Archive quarter-inch tape cartridge
rmt0	Nine-track magnetic 1/2" tape-Tapemaster controller
rst0	SCSI tape controller cartridge
rxt0	Nine-track magnetic 1/2" tape - Xylogics controller
rfd0	Floppy diskette drive
rfd0c	Floppy diskette drive (Sun386i)

For example, to load the information from the primary Sun 3/60 Workstation SCSI tape drive, you would type the command:

tar xvf /dev/rst0

While the software is being extracted from the tape or diskette, the list of files being extracted will be displayed. After the software has been fully extracted, go on to "Running PMinstall".

Running PMinstall

At this point in the installation procedure you should be logged on as root and have the /usr/portmaster directory as your current working directory. Simply enter the command:

pminstall

Your display should show the following menu:

```
1 Portmaster Internet Address Setup
2 Host Installation
3 Portmaster Upgrade
4 Host Upgrade
5 Exit

Please select an option from above:
```

Use this menu to select the appropriate option. The following paragraphs describe the functions of the first two menu selections.

Host Software Installation

The first time you load the host software, select Item 2 from the menu, "Host Installation". If you are adding another PortMaster to the network, go on to the following section **PortMaster Internet Address Setup**.

From the PMinstall menu, select 2, followed by RETURN. The following dialog will be displayed:

Note: *The contents of the following dialog will vary depending on the extent to which networking functions have already been installed on this Sun Workstation. If this is a standalone workstation which has never been connected to a network, a simple "y" (yes) response to all questions will work well. If this workstation is connected to an existing network please consult your network administrator and Sun network administration manuals for the correct responses.*

```
Performing Host Installation.
Default Host internet address = 192.9.200.1
Use default? (y/n) y
Adding host entry in /etc/hosts for <host>
Starting local network interface.
Performing Software Installation.
Updating /etc/services
Installing in.pmd daemon
Updating /etc/inetd.conf
Host Installation Completed.

1 Portmaster Internet Address Setup
2 Host Installation
3 Portmaster Upgrade
4 Host Upgrade
5 Exit

Please select an option from above:
```

The menu is then redisplayed. At this point, the host software is installed and the host internet address assigned.

PortMaster Internet Address Setup

Please verify that the new PortMaster has been physically connected to the network and has been powered on before starting this section.

From the PMinstall menu, select item 1, follow by RETURN. The following dialog will be displayed:

```
Please enter the PortMaster name:<portmaster_name>
```

Where *<portmaster_name>* is the "network" name you want to assign to the new PortMaster (ie. portmaster1, portmaster2, etc...). If the PortMaster and Sun Workstation are being installed on a stand-alone network then any name may be used. If this name has not already been established as a valid network host name, you will receive the following prompt:

```
Cannot find host entry for <portmaster_name>
Would you like to add a new one? (y/n) y
Use system assigned internet address? (y/n) y
Confirm add: Host: <portmaster_name> Address:
192.9.200.2 ? (y/n) y
```

Once the PortMaster name and internet address have been verified, the following messages will appear (this may take between 5 and 20 seconds):

```
Listening on network for heartbeat of new
PortMaster ...
Found heartbeat
PortMaster internet notification complete.

1 Portmaster Internet Address Setup
2 Host Installation
3 Portmaster Upgrade
4 Host Upgrade
5 Exit

Please select an option from above: 5
```

At this point, the new PortMaster is initialized and known to the network. The next chapter, Administration, describes the administration of the PortMaster, port configurations and so

forth. Read the section on starting and logging into the PortMaster and then complete the steps described in setting the Global Configuration.

Administration CHAPTER 3

PortMaster Console

PortMaster Console (PMconsole) is the PortMaster administration program. The program uses the Sun graphical interface and provides several windows through which you can configure the PortMaster ports, monitor the performance, and install other PortMasters on your network.

Each window in the PortMaster Console has a set of buttons. To select a button, position the mouse cursor inside the button you wish to select and press the left mouse button. Windows can be re-positioned as with other Sun windows.

Running PMconsole

To run the PMconsole program, enter the following command:

pmconsole

The window in Figure 3-1 will be displayed.

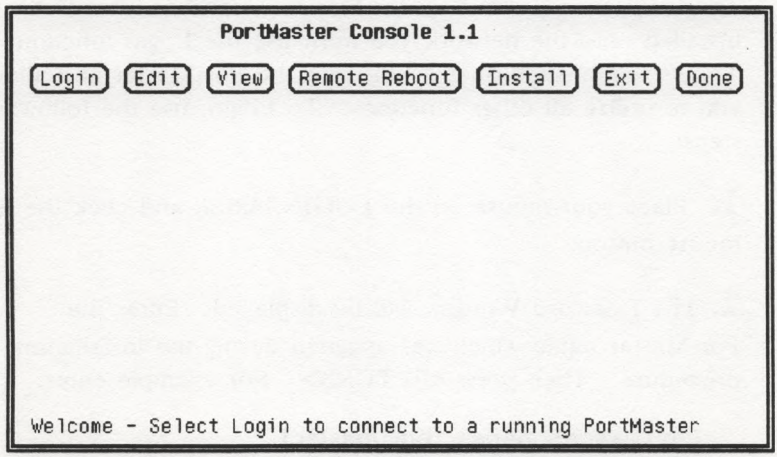

Figure 3-1. PortMaster Console login display

This is the primary window in the PortMaster Console program. From this window all other windows and functions of the software are accessible. The mouse buttons across the top of the window are used to access the various functions. PortMaster Console window has the following buttons:

- Login – to access any PortMaster
- Edit – to set the port configurations, network configurations and administration password.
- View – to view all port configurations and data traffic
- Remote Reboot – to remotely reboot the PortMaster
- Install – to install a PortMaster onto the network or to install new software releases
- Exit – to exit the PortMaster Console program
- Done – to close the PortMaster Console window into the iconic state

A detail description of each of these button functions is described below.

PortMaster Login

To communicate with any PortMaster which has already been installed onto the network you must use the Login function. This function establishes a link with the PortMaster and allows you to utilize all other functions. To Login, use the following steps:

1. Place your mouse on the LOGIN button and click the left mouse button.

2. The Password Window will be displayed. Enter the PortMaster name which was assigned during the installation procedure. Then press <RETURN>. For example enter:

```
Portmaster Name: portmaster1
```

3. Enter the password, if any, and press <RETURN>. When the PortMaster is initially installed there is no password.

There will be a message stating that the connection is being attempted. With a successful login, the main PortMaster window (Figure 3–2) will be displayed.

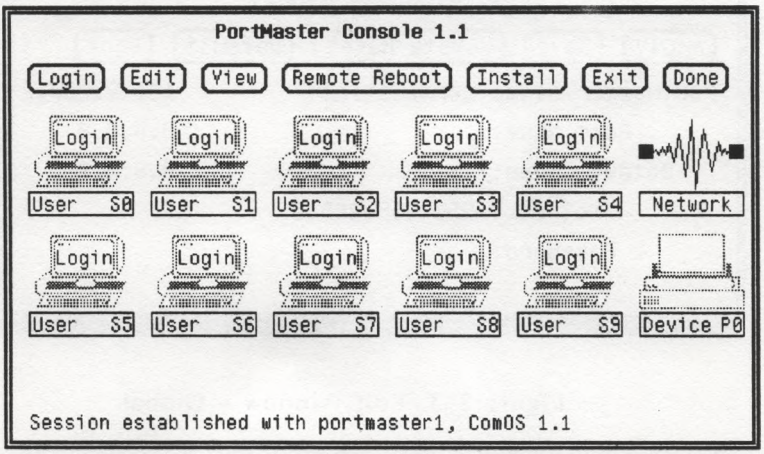

Figure 3–2. PortMaster Console icon window

The PortMaster Console window displays the port icons for the 10 serial ports (S0–S9), the parallel port (P0) and for the network (Ethernet).

Global Configuration

After the PMinstall program has been run, or if the PortMaster is moved to a new network, you will need to tell it about the network internet addresses. In addition, the global configuration window is used to change the PortMaster Administration password. From the PortMaster Console, do the following:

1. Position the cursor on the Network icon (upper right corner, above the Device P0), and click the left mouse button. The Network icon will change to reverse video.

2. Select the EDIT button. The window in Figure 3–3 will be displayed.

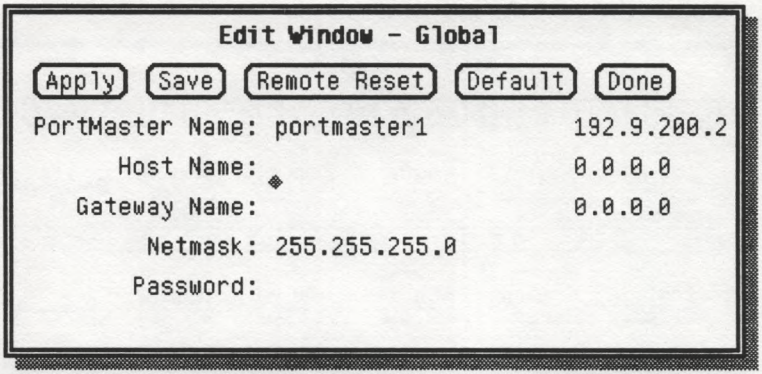

Figure 3–3. Edit Window – Global

3. Enter the following information, terminated by pressing RETURN:

- **PortMaster Name** – name of PortMaster as entered during the installation procedure.
- **Host Name** – name of PortMaster host. This is the name of the Sun Workstation which the PortMaster will be connected to during operation.
- **Gateway Name** – If the PortMaster is being connected to a network with gateway systems, then the name of the gateway on the same network should be entered. Otherwise, just enter the Host Name from above.
- **Netmask** – defaults to 255.255.255.0. This should only be modified if your site uses subnetting. Consult you network administrator for this information.
- **Password** – PortMaster administration password.

As each of the first three items is entered, the internet address will be displayed to the right. These addresses were established by PMinstall if this is a stand-alone installation, or by your network administrator. The Netmask should not be changed unless you are using sub-nets and understand their operation. Refer to the Sun documentation for more information on sub-nets. The password entry requires being entered twice, to ensure that the password was entered correctly. The password can be changed at any time by following the procedures of this section.

4. Select the SAVE button to store the data on the PortMaster disk. At the bottom of the window will be a message:

Configuration parameters successfully saved.

5. Select the DONE button. At this point, the PortMaster has all the information necessary to begin normal serial communications with its host. Within 1 minute, the Network icon will show a jagged communication line indicating that it has established a link to its host.

Installation from PortMaster Console

To install a PortMaster from the PortMaster Console, instead of using the program PMinstall as described in Chapter 2, select the INSTALL button. The window in Figure 3-4 will appear. The option buttons in this window are the same options available with PMinstall (See Chapter 2, Running PMinstall):

- New PortMaster
- New Host
- Upgrade PortMaster
- Upgrade Host

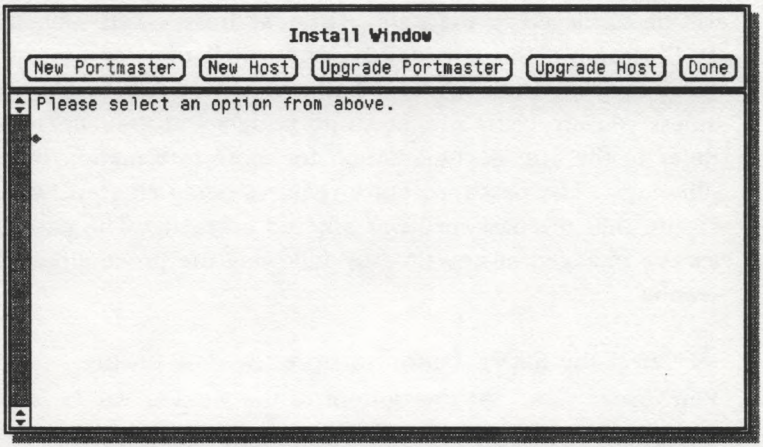

Figure 3–4. PortMaster Install window

One reason for using this method instead of running PMinstall from the UNIX command line is that the workstation window can be scrolled. In this way you can view the entire setup process by using the scroll bars. The Upgrade PortMaster and Upgrade Host are used for the installation of new software releases.

Setting the Serial Port Configuration

To set the configuration of any of the 10 serial ports, use the following general procedure:

1. From the PortMaster Console window, select a serial port icon by placing the mouse cursor on the icon of the port and clicking the left button.

2. Select the EDIT button. The Edit Window for the selected serial port (Figure 3–5) will appear. From this window you can modify the serial port configuration parameters.

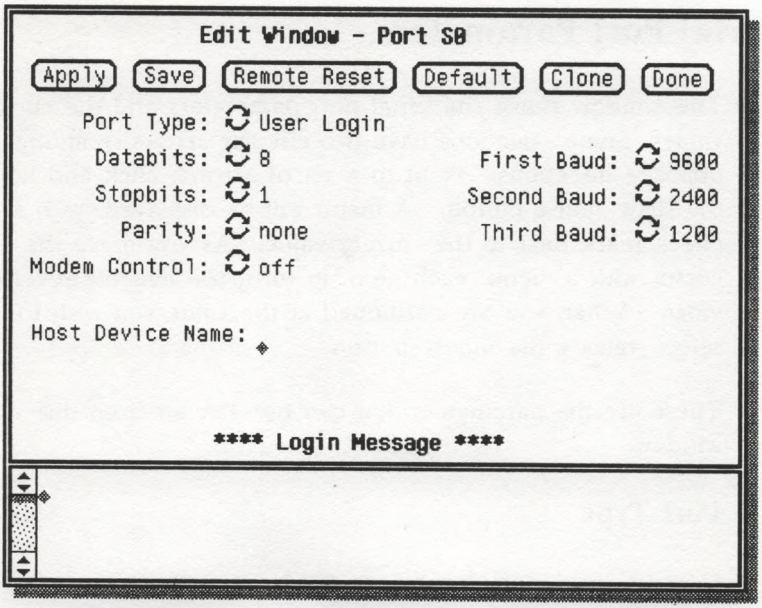

Figure 3–5. Edit Window – Serial Ports

This window has the following buttons:

- APPLY – send the configuration to PortMaster memory. Does not take effect until you select REMOTE RESET. These values are temporary until you select SAVE. If power is removed from the PortMaster, the new parameter values will no longer be stored in the PortMaster.
- SAVE – performs an APPLY and stores the port configuration on the PortMaster configuration disk.
- REMOTE RESET – reset the serial port using the values stored by the APPLY or SAVE selection.
- DEFAULT – set the on–screen values to the port default configuration.
- CLONE – copy the port configuration from another port.
- DONE – return to the PortMaster Console window.

Serial Port Parameters

This window shows the serial port parameters and the current values. Some selections have two circular arrows, pointing opposite directions. Point to a set of arrows, click and hold the right mouse button. A menu will be displayed, with a check mark next to the current value. As you move the cursor with a menu, each item, in turn, will become reverse video. When you are positioned at the value you wish to select, release the mouse button.

These are the parameters that can be selected from this window:

Port Type

User Login – (default) the specified port will display a login prompt to the user. After successful baud rate matching and receiving a login name, the user will be transferred directly to a login session on the host Sun Workstation.

Host Device – the port will operate as a host controlled device on the Sun Workstation. The Host Device field described below must be entered.

Two–Way – (or bidirectional) the port will operate in User Login mode if carrier is detected on pin 8 of the RS–232–C connector. Otherwise it can be accessed as a host controlled device on the Sun Workstation. The Host Device field described below must be entered.

Data bits

5, 6, 7, or 8 databits may be selected. The default is 8. This value should be set to match the device being attached to the PortMaster.

Stop bits

1 or 2 stop bits may be selected. The default is 1. This value should be set to match the device being attached to the PortMaster.

Parity

Odd, even, or none may be selected. The default is "none". This value should be set to match the device being attached to the PortMaster.

Modem Control

On or off may be selected. The default is "off". Uses the modem carrier detect line. The device will be idle until the carrier detect line becomes true.

Baud Rates

Three different baud rates may be specified. These baud rates are used for speed matching with the device being attached to the PortMaster. Speeds are sequentially matched from the First Baud rate through the Third Baud rate. In Host Device mode, only the first baud rate is used.

- First Baud – the first baud rate that PortMaster uses to synchronize with the attached device. (default = 9600 baud)
- Second Baud – the second baud rate that PortMaster uses to synchronize with the attached device. (default = 2400 baud)
- Third Baud – the third baud rate that PortMaster uses to synchronize with the attached device. (default = 1200 baud)

Host Device Name

This is required in either the Host Device or Two-Way modes. The Host Device name is the name of a pseudo tty device in the workstation directory /dev. Standard device entries are:

/dev/ttyp0 - /dev/ttypf
/dev/ttyq0 - /dev/ttyqf
/dev/ttyr0 - /dev/ttyrf
/dev/ttys0 - /dev/ttysf

There is a utility included with the PortMaster software called lstty. This program lists only the pseudo-tty devices that are in /dev, sorted in numerical order. It is a quick way to check on what pseudo-tty devices you have in your /dev directory. This program resides in the /usr/portmaster directory. Simply use the command:

lstty

See Appendix A for discussion of device drivers.

Login Message

The message to be displayed to the user prior to the login prompt. Up to 255 characters can be in the message.

Enabling Serial Port Parameters

If you would like to try a new port configuration, without saving to the PortMaster disk:

1. Select APPLY

2. Select REMOTE RESET

The new port configuration will now be in effect, until power is removed from the PortMaster or changed again.

If you want to save the new configuration in the permanent PortMaster configuration, select SAVE.

Setting the Parallel Port Configuration

This device type is always Host Device. For the parallel port to become active, assign a Host Device name (/dev/<device>) as described above under the heading "Host Device Name".

Monitoring the PortMaster

From the PortMaster Console window, select the VIEW button. A window similar to Figure 3-6 will be displayed.

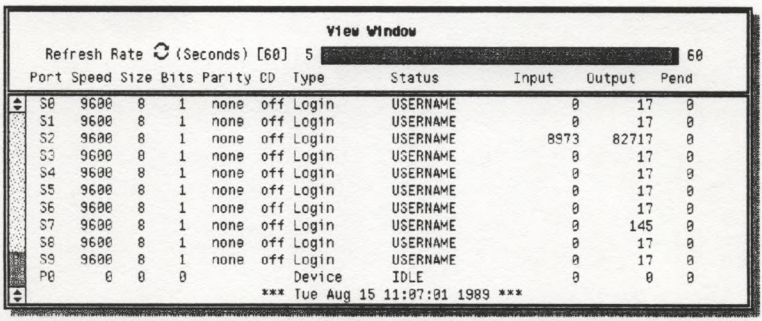
View Window
Refresh Rate (Seconds) [60] 5
60
Port Speed Size Bits Parity CD Type Status Input Output Pend
S0 9600 8 1 none off Login USERNAME 0 17 0
S1 9600 8 1 none off Login USERNAME 0 17 0
S2 9600 8 1 none off Login USERNAME 8973 82717 0
S3 9600 8 1 none off Login USERNAME 0 17 0
S4 9600 8 1 none off Login USERNAME 0 17 0
S5 9600 8 1 none off Login USERNAME 0 17 0
S6 9600 8 1 none off Login USERNAME 0 17 0
S7 9600 8 1 none off Login USERNAME 0 145 0
S8 9600 8 1 none off Login USERNAME 0 17 0
S9 9600 8 1 none off Login USERNAME 0 17 0
P0 0 0 0 Device IDLE 0 0 0
*** Tue Aug 15 11:07:01 1989 ***

Figure 3-6. View Window

This window allows you to view the configuration and Status of each port. In addition, there are three columns labeled: Input, Output, and Pending. These relate to the number of bytes transferred in our out the port and the number of bytes in the PortMaster output buffer which are pending to be output. These values are refreshed at a specific rate as

defined by the "Refresh Rate" values at the top of the window. Use the cycling-arrow icon or the slide bar to set the Refresh Rate. The Refresh Rate slide bar can be set to correspond to either seconds or minutes by selection with the mouse.

WARNING

The data which is read at each cycle of the Refresh Rate is stored in the scrollable window on the display. To maintain this data, a temporary file is created in the /tmp directory of the Sun Workstation. If the file is left to increase in size unattended, the disk partition will completely fill to its capacity.

ASCII Terminal Command Interface

Any of the previously described administration activities of the PortMaster can be performed using an ASCII terminal connected to a PortMaster serial port. Simply connect an ASCII terminal to a PortMaster serial port. Set the ASCII terminal to the communication parameters which have been previously set for that port or the default parameters if no settings have been made (Default: 9,600 baud, 8 data bits, 1 stop bit, and no parity).

The ASCII Terminal Interface Commands

The following commands are available:

- SET Command – set the various parameters to a particular state, baud rate, data bits, parity, device name, etc.

- SHOW Command – shows the status of each port or all ports and global data.

- REBOOT Command – reboot the PortMaster to the currently saved configuration.

- RESET Command – reset a port to the currently stored configuration.

- VERSION Command – displays the version number of the PortMaster software.

- QUIT, DONE, EXIT Commands – leave the Command mode.

- SAVE Command – save the current configuration to the PortMaster disk.

- HELP Command – provides a very brief example of the command syntax.

Using the Commands

To use the ASCII Command Interface, you must login to the PortMaster using a special administrators user name and password. At the login prompt enter:

```
login: !root
```

The program will request that you enter a password. This is the PortMaster administration password. After initial installation, there is no password. Upon entering the correct password, the program will display the prompt:

```
Command>
```

It is at this point that you can begin to use the PortMaster commands. Each command responds to the minimum number of characters, at least two, that are unique to that command. Command entry is not case sensitive.

SET Command

The SET command is used to set each of the configuration parameters, including global parameters, and port parameters.

Setting Global Parameters

The syntax for setting global parameters is:

SET *parameter value*

Where *parameter* is one of:

ADDRESS – The PortMaster network internet address.
HOST – The Sun Workstation host internet address.
GATEWAY – The Sun Workstation gateway internet address.
NETMASK – The subnetting internet address mask.

and *value* is a valid host internet address in the form:

XXX.XXX.XXX.XXX

where the XXX is a decimal number between 0 and 255.

– OR –

Where *parameter* is:

PASSWORD – The PortMaster administration password.

and *value* is a string of characters to be used for the administration password.

Setting Port Types

The syntax for setting port types is:

SET *port type [device]*

Where *port* is one of: S0 – S9 or P0

Type is one of:

LOGIN – (default) the specified port will display a login prompt to the user. After successful baud rate matching and receiving a login name, the user will be transferred directly to a login session on the host Sun Workstation.

DEVICE – the port will operate as a host controlled device on the Sun Workstation. The Host Device field described below must be entered.

TWOWAY – (or BIDIRECTIONAL) the port will operate in User Login mode if carrier is detected on pin 8 of the RS–232–C connector. Otherwise it can be accessed as a host controlled device on the Sun Workstation. The Host Device field described below must be entered.

DISABLED - can be used for port P0 to disable the /dev entry. When reset, the P0 port will go to an idle (unused) state.

device is of the form:

/dev/<*tty_device*>

This is required in either the Host Device or Two-Way modes. The Host Device name is the name of a pseudo tty device in the workstation directory /dev. Standard device entries are:

/dev/ttyp0 - /dev/ttypf
/dev/ttyq0 - /dev/ttyqf
/dev/ttyr0 - /dev/ttyrf
/dev/ttys0 - /dev/ttysf

There is a utility included with the PortMaster software called lstty. This program lists only the pseudo-tty devices that are in /dev, sorted in numerical order. It is a quick way to check on what pseudo-tty devices you have in your /dev directory. This program resides in the /usr/portmaster directory. Simply use the command:

lstty

See Appendix A for discussion of device drivers.

Setting Port Parameters

The syntax for setting port parameters is:

SET *port parameter value*

Where *port* is one of: S0 - S9 or P0

Parameter and *value* is one of:

SPEED - The baud rate for the port.
An extra value is entered after the "SPEED" key word

to indicate which of the three optional baud rates is being set. Valid values are: 1, 2, or 3. This is followed by the actual baud rate. Valid values are: 19200, 9600, 4800, 2400, 1200, 300

PARITY – The parity checking to be used for the port.
Valid values are: EVEN, ODD, or NONE

DATABITS – The number of databits per byte.
Valid values are: 8, 7, 6, or 5

STOPBITS – The number of stop bits in the data frame.
Valid values are: 1 or 2

CD – Whether to use the carrier detect signal.
Valid values are: ON or OFF

MESSAGE – The login message to be displayed to the user prior to receiving the login prompt. The value for this parameter is a string of up to 255 characters. New–lines are designated by using the carat symbol (^).

Examples of the **SET** command are:

set s1 speed 2 4800

sets the second baud rate to use for speed matching to 4800 baud.

set s1 login

sets the Device Type on serial port S1 to User Login.

set s1 twoway /dev/ttyr0

sets serial port S1 to a two–way device using /dev/ttyr0 as the device name on the host Sun Workstation.

set s1 message Welcome to the PortMaster

displays the login message: "Welcome to the PortMaster" on serial port S1.

The SET command stores the values and instructions in the PortMaster memory. No new changes take effect until you enter a RESET command.

SHOW Command

The SHOW command allows you to look at the current settings for any of the serial ports and for the parallel port.

The syntax for the show command is:

SHOW *port*
– or –
SHOW ALL

For example:

show all

Shows the settings of all global parameters and a summary of each of the individual ports. This display is similar to the VIEW command in the Sunview based PMconsole described earlier in this chapter.

show s1

Displays the full full set of configuration values for serial port S1.

REBOOT Command

Reboots the PortMaster, loading the currently saved serial and parallel port parameter values. All ports will be set to the state of the last saved configuration. The syntax is:

REBOOT

RESET Command

Reset a port to it's currently stored values. Any terminal that is logged in through the PortMaster will be disconnected. You will need to log in again. The syntax is:

RESET *port*
– or –
RESET ALL

Where *port* is one of S0 – S9 or P0

QUIT, DONE, EXIT Command

These commands will log you out the PortMaster command mode and will return you to login mode.

SAVE Command

Saves the current port configurations to the PortMaster disk. The syntax is:

SAVE ALL
– or –
SAVE *port*

Where *port* is one of S0 – S9 or P0. Using SAVE ALL will store all global parameters on the PortMaster disk.

HELP Command

Provides a very brief example of the command syntax. For example:

HELP SET

displays the syntax for the set command:

```
Usage: set S0-S9,P0,all option value
```

Using /dev Entries _____APPENDIX A

On the workstation is a directory called /dev. This directory contains a list of devices. Some devices are pseudo devices called pseudo tty's. A pseudo tty device is a process that acts like a serial device, such as a terminal. There can be up to 255 of these. Each connection to the PortMaster requires a pseudo tty device. In addition, other Sun software programs use pseudo tty devices. These include; workstation shelltool windows, rlogin, rsh or other network processes.

First, to use a device, the operating system has to have support for that device. The second thing you need to access a device is an entry in /dev which is the name of that device. The name entry in /dev cross references to a major device number and a minor device number. The major device number is used for a single type of device in the operating system. Psuedo ttys use the major device number 20 on Sun Workstations. Then each of the devices which acts like a pseudo tty is assigned a minor device number. For example, the entry, /dev/ttyp0, is the first pseudo-tty entry in /dev. The device 'name' is ttyp0. If the command:

ls -l /dev/ttyp0

is performed, the following entry would be displayed:

```
crw-rw-rw-  1 root       20,   0 Sep  2 08:20 /dev/ttyp0
```

This indicates that /dev/ttyp0 has major device number 20 (a pseudo tty) and minor device 0 (the first minor device number).

Using Default /dev Entries

To use the default /dev devices, simply use the path and name of the device, for example:

/dev/ttyp0

The PortMaster device types Device and TwoWay require a device name, which is found in the /dev directory. The generic Sun Workstation operating system has support for 48 pseudo devices. To go beyond the 48 devices, you must modify your UNIX kernel.

Modifying your UNIX kernel

Refer to the Sun Installation documentation for more complete descriptions of these steps. In the System and Network Administration Guide, see the Re-configuring the System Kernel chapter. In the generic configuration file, in the /sys directory, there is a line dealing with pseudo-tty devices. This line sets the default number of pseudo-tty devices to 48:

```
pseudo-device  pty    #psuedo-tty's, also needed for SunView
```

Change the entry from 'pty' to 'pty64' and you will set the number of pseudo-tty devices to 64. Append any number you wish, up to 255 to the 'pty' entry. No number defaults to 48 devices. You will then need to re-build your kernel, as described in the Sun documentation.

Using MAKEDEV

The last step is to make entries in /dev to match the operating system support. The first 64 are created using a program called MAKEDEV. During a standard SunOS installation the first 48 device entries will be automatically created. They are:

/dev/ttyp0 - /dev/ttypf
/dev/ttyq0 - /dev/ttyqf
/dev/ttyr0 - /dev/ttyrf

An additional 16 may be created using MAKEDEV which is located in the /dev directory. Use the command:

MAKEDEV pty3

and /dev/ttys0 – /dev/ttysf will be created.

Using PMDEV

To create entries above 64 devices, use PMDEV which is located in the /usr/portmaster directory. This command takes the form:

PMDEV pty[4, 5, 6]

Each time you use PMDEV, 32 devices are added to the /dev directory. For example, the command:

PMDEV pty4

would create an additional 32 devices:

/dev/tty40 – /dev/tty5F

Repeat PMDEV up to pty6 to create a total of 255 entries in /dev.

There is a utility included with the PortMaster software called lstty. This program lists only the pseudo–tty devices that are in /dev, sorted in numerical order. It is a quick way to check on what pseudo–tty devices you have in your /dev directory. This program resides in the /usr/portmaster directory. Simply use the command:

lstty

Specifications APPENDIX B

Network Interface

10-Mbps Baseband IEEE 802.3 compatible interface utilizing TCP/IP protocol.

Connector Type	Cable Type	Transmission Distance
15 Pin DIX for connection to external transceiver	RG-11 50 Ω coaxial	Trunk segment 1640 ft/500 m max Transceiver cable - 164 ft/50 m max Network trunk - 8200 ft/2500 m max
BNC T-Connector	RG-58 A/U 50 Ω coaxial	Trunk segment - 984 ft/300 m max Station distance - 1.5 ft/0.5 m min Network trunk - 3035 ft/925 m max

Communications Interface

10 RS-232 serial ports.
Data Rates selectable up to 19.2Kbps.
Software flow control XON/XOFF.
DB-25, DTE pinout female connectors.
Terminal, Host, Modem support:DTR, DSR, DCD, TXC, RXC
1 Centronics compatible parallel port.

Physical Dimensions

Length: 12.9 in/32.8 cm
Width: 10.9 in/27.7 cm
Height: 5.6 in/14.2 cm
Weight: 14.5 lb/6.6 kg

Power Requirements

110 VAC +-10%, 47 to 63 Hz, 1.0A
220 VAC +-10%, 47 to 63 Hz, .6A

Environmental Operating Range

Temperature: 41° to 113° F/5° to 45° C
Humidity: 20% to 80%

Glossary APPENDIX C

ASCII
American Standard Code for Information Interchange. A standard 8-bit code commonly used by computers and communications equipment.

baud
The number of discrete signal events per second occurring on a communications channel. Although not technically accurate, baud is commonly used to mean bit rate.

bps
bits-per-second

button
In this manual, this refers to outlined selections in a window display that can be activated by pointing and clicking the mouse.

byte
8 binary bits

Device Type
For the PortMaster there are three device types: Device, User Login, and TwoWay. Both Device and TwoWay require a device name assignment.

Ethernet
An effective means of interconnecting large numbers of computers and related devices. Uses coaxial cable to carry the data between components on the network.

file
A method of organizing and storing or retrieving data, on a disk or in memory.

icon
A visual image, on the display, of a shape denoting the purpose of a program function.

interface
The connection or communication between various system elements.

modem
A device to allow computer communication using ordinary telephone lines. This device connects to the PortMaster through a serial port.

mouse
A pointing device, usually with at least two functional buttons. In this document, the left mouse button selects buttons in a window. The right mouse button causes pop-down menus to be displayed, on some windows.

parallel port
A computer port through which data flows, all bits at the same time, in parallel. In this manual, this mean a Centronics-compatible parallel printer port.

port
The channel through which data flows. The physical connection to the CPU, such as a parallel printer port or a serial port.

printer
A device for putting computer-generated information on paper or other media. This device can have either a serial or parallel interface, or both.

RS-232 interface
A standard of data communication using serial data and control signals.

serial port
A bi-directional channel through which data flows one bit at a time, most often 10-bits to a character of data: start bit, 8 data bits, 1 stop bit.

TCP/IP
A standard communications protocol developed by the U.S. Department of Defense.

terminal
In this manual, this refers to a device with a keyboard and a display for communicating with a computer. This is an ASCII device with an RS-232 serial interface.

Thick Ethernet
An Ethernet connection using a multi-pin D-shell connector and a cable to a transceiver. Generally using RG-11 50Ω coaxial cable.

Thin Ethernet
An Ethernet connection where the transceivers are built in to the device and a BNC connector and cable are used for the Ethernet connection. Generally using RG-58 50Ω coaxial cable. Note: The PortMaster is factory set to be either Thick or Thin Ethernet, not both at the same time.

TwoWay Mode
A device that is used either as a User Login or a Host Device, to which the system sends information. A device name must be assigned.

UNIX
A multi-user, multi-tasking operating system.

User Login Mode
A PortMaster mode that communicates with an ASCII terminal, with someone logging in through the PortMaster.

window
An area of the workstation display dedicated to a particular function or process.

workstation
A system, usually a desktop unit, that contains a computer, display, keyboard, mouse and, perhaps, a disk drive or drives.